



PRACTICAL BRIDGE TO BRIDGE COMMUNICATIONS

Winter Training
2004



OBJECTIVES



1. Know the different methods of communication aboard the Navy 44.
2. Be able to sketch a working diagram of Navy 44 comms equipment from microphone to antenna, showing all switch positions.
3. Understand how the different methods of communications work.
4. Know when each method of communication is used.
5. Understand how to hail a merchant vessel and practice hailing merchant vessels.
6. Understand the communication procedures used during summer cruise.
7. Know Radio Telephone (R/T) communications lingo.



REFERENCES



- Chapman Piloting – CH 24 Communications
- Passage Making – CH 7 Communications
- Fundamentals of Naval Science – CH 6
Radiotelephone Usage
- Reed's Nautical Almanac
- Tech manual
- Radiotelephone Users Training Handbook (RUTH)
- ACP 125



NAVY 44 COMMS EQUIP



SSB HF
Radio

FURUNO
Weather Fax

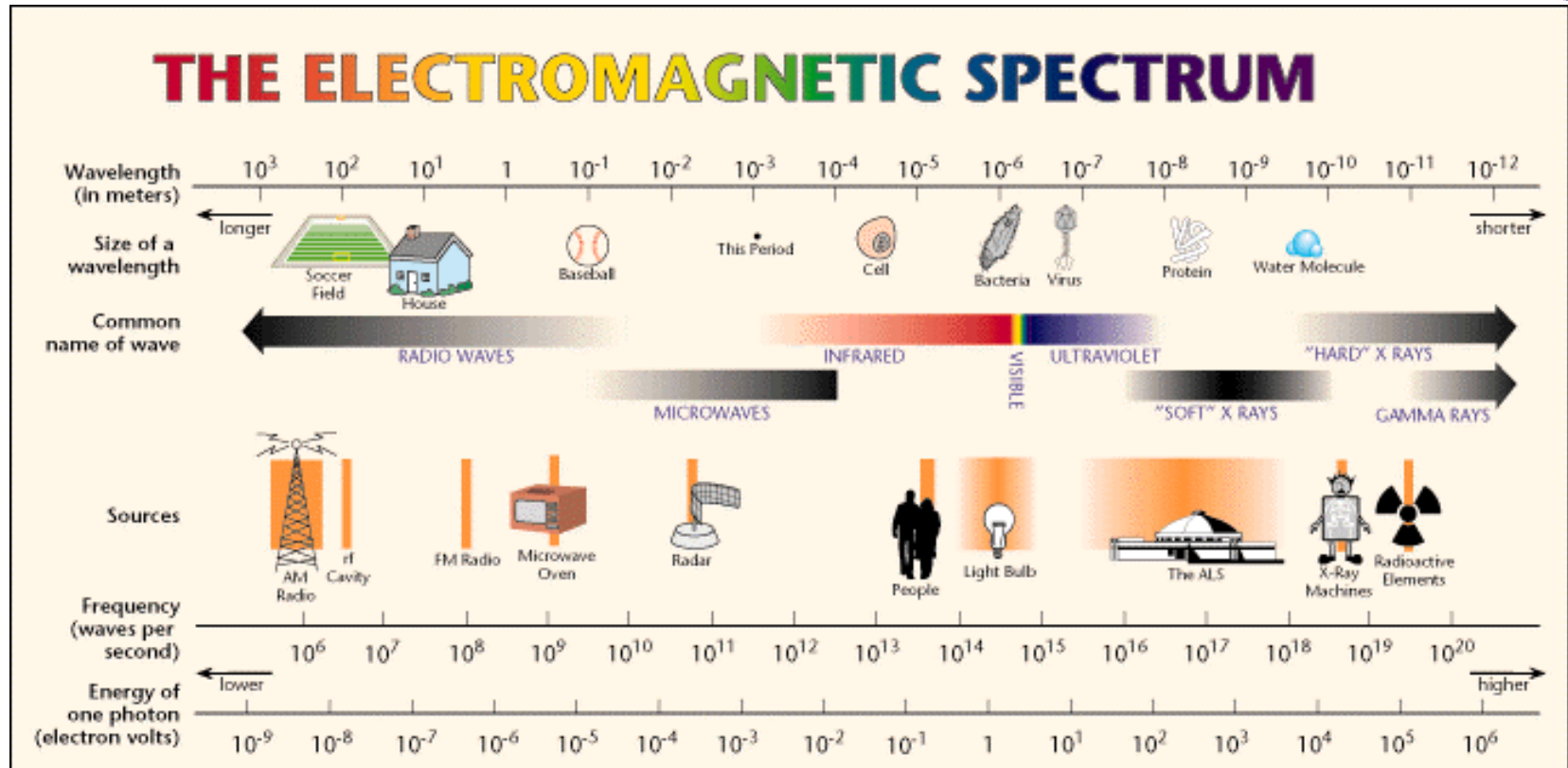
SSB/Fax
Selector
Switch

ICOM
VHF
RADIO





COMMS FREQ





Communications Frequency Chart

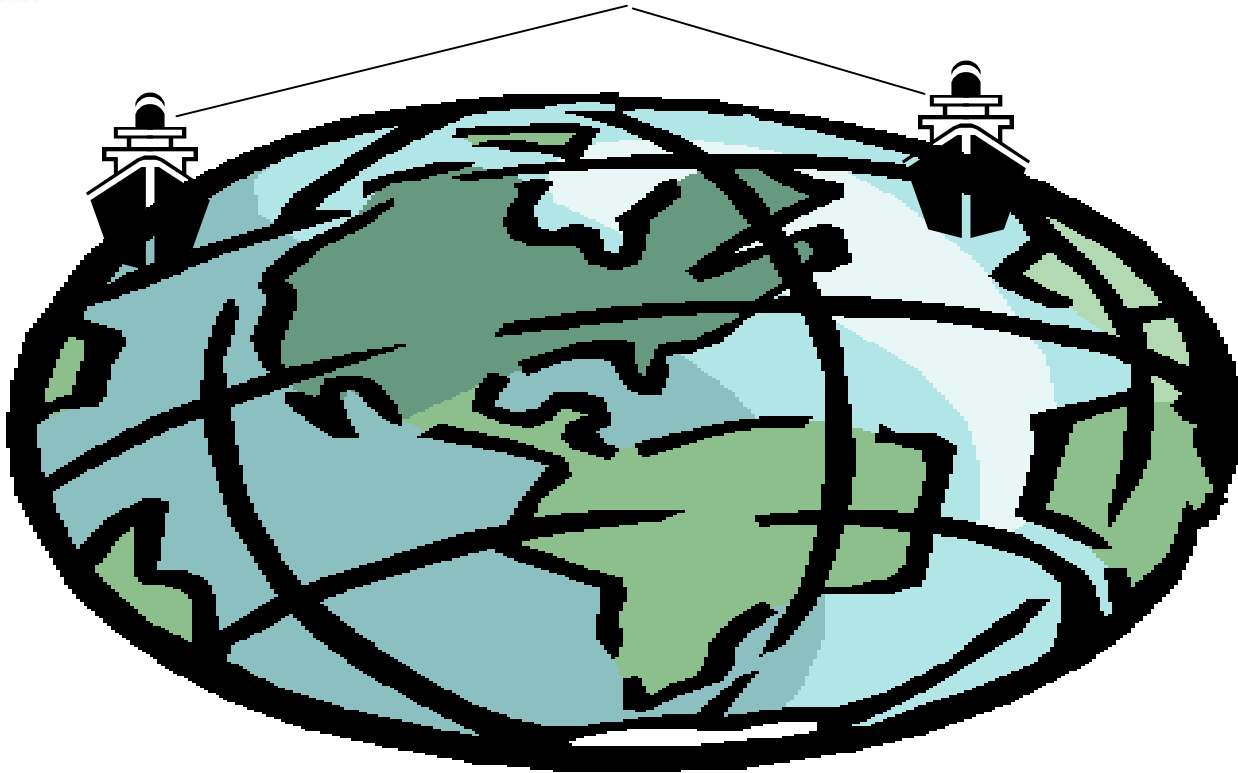


Band	Band Name	Frequency Range
ELF	Extremely Low Frequency	30 - 300 Hz
VLF	Very Low Frequency	3 - 30 kHz
LF	Low Frequency	30 - 300 kHz
MF	Medium Frequency	300 kHz - 3 MHz
HF	High Frequency	3 - 30 MHz
VHF	Very High Frequency	30 - 300 MHz
UHF	Ultra High Frequency	300 MHz - 3 GHz
SHF	Super High Frequency	3 - 30 GHz
EHF	Extremely High Frequency	30 - 300 GHz

Band	Frequency Range	Comments
Long wave	0 - 300 kHz	often considered to be anything below AM broadcast band (below 540 kHz)
Medium wave	300 kHz - 3 MHz	often considered to be the AM broadcast band (540 - 1700 kHz)
Short wave	3 - 30 MHz	often considered to be from top of AM broadcast band (1700 kHz) to 30 MHz



HF COMMS





HF COMMS



- Used for long distance ship to ship or ship to shore communications.
- Navy 44 has SEA 222 SSB radiotelephone.
- HF circuits are either DUPLEX or SIMPLEX
 - DUPLEX – separate transmit and receive frequencies.
 - SIMPLEX – same transmit and receive frequencies.
- What is the maximum range for HF communications?

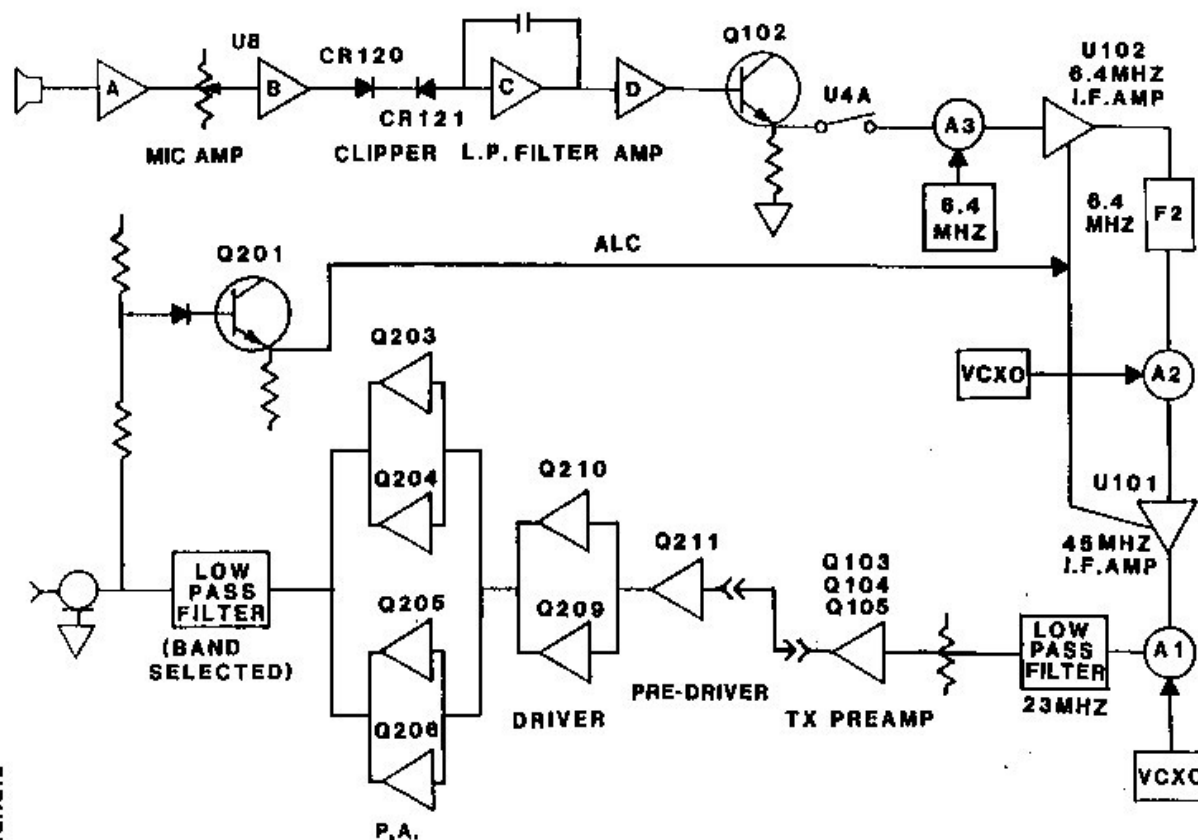
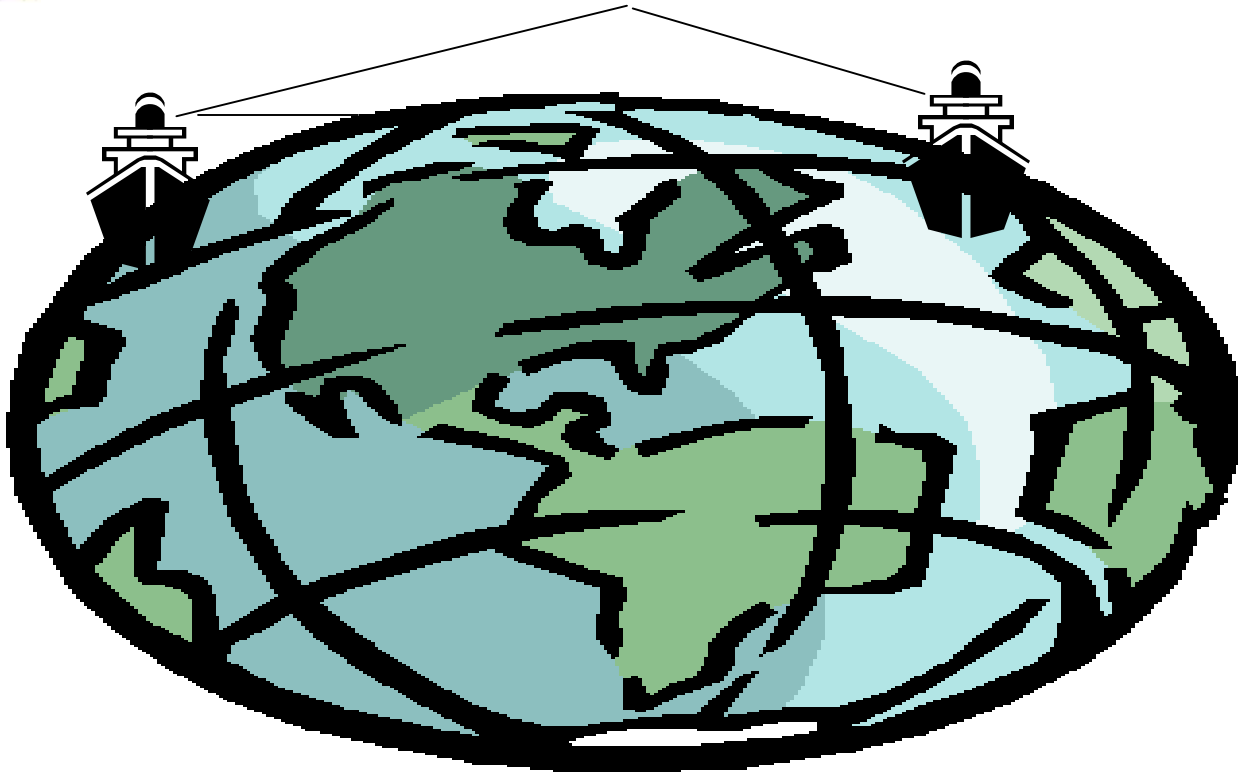


FIGURE 5.4.1

TRANSMIT BLOCK DIAGRAM
SEA 222



HF COMMS



HF communications have both ground waves and sky waves. HF can travel thousands of miles due to RF signal bouncing off the atmosphere.



HF COMMS



- What factors effect the range of HF?
 - Atmospheric conditions (weather)
 - Convergence/Skip zones
 - Time of day
 - Frequency used
 - Rule of thumb: “Up with the sun” (use higher frequencies as the day progresses)



HF COMMS



- How do you select a frequency in the radio?
 - Frequencies are stored by pairs (xmt/rcv) in bins (programmed by user) or ITU channels (preprogrammed in ROM at factory).
 - To use radio, you must enter bin or channel number, not the frequency. If you enter a frequency, the radio will be receive only.
 - USNA Communications frequencies are detailed in the Navy Sailing Summer Cruise OPOORDER between 4037.0Hz – 12417.0 Hz



HF COMMS



- Channel vs. BIN
 - Channels are preset by the factory for transmit/receive frequencies.
 - List of stations/channels/frequencies are found in owner's manual for radio (Tech Manual Binder on the boat)
 - When contacting another station, they may ask you to communicate on a specific frequency – you must know the channel number (from table in Owner's Manual) to be able to communicate on that specific frequency.



HF COMMS



- BINs are “scratch pad” memory locations that allow the user to store specific frequencies.
 - Separate transmit and receive frequencies are stored for each BIN number
 - Frequencies listed in OPORD must be stored in BINS.
 - NOTE: USNA circuits are SIMPLEX – there is only one frequency listed for both transmit and receive.



HF COMMS



- To transmit on radio:
 - Ensure the antenna coupler switch is selected to SSB.
 - Enter the bin or channel number for the proper frequency.
 - Tune the antenna coupler – key the microphone and whistle in the microphone. The coupler will automatically adjust and an * will appear on the display when the coupler is tuned.
 - You are ready to make your call.



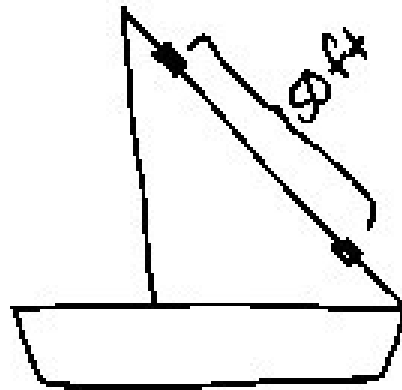
HF COMMS



- What does the antenna coupler do?
 - Antenna transmits most efficiently when it is tuned to the frequency being transmitted.
 - What frequency is the antenna on the Navy 44 most efficient?



Antenna Coupler



Length of antenna = 50 ft = 16.67m

$$\Rightarrow \frac{\lambda}{2} = 16.67\text{m} \Rightarrow \lambda = 33.34\text{m}$$

$$f = \frac{c}{\lambda} = \frac{3 \times 10^8 \text{ m/s}}{33.34\text{m}} = 9.0 \text{ MHz}$$



HF COMMS



- The antenna coupler uses an RLC circuit to “electrically change” the length of the antenna to match the frequency (wavelength) of the radio to the antenna.
 - This allows the radio to use multiple frequencies with the same antenna and maximize transmission efficiency of the antenna.



HF COMMS



- Which frequency do you chose?
 - Rule of Thumb – frequency follows the sun – higher the sun in the sky, higher the frequency.
 - Appendix II of Annex A of the OPORD has the Communications Plan which lists all the frequencies and times for HF voice.
 - 4,6,8,12 MHz



Satellite Phones



- NA 2 and 17 have Satellite phones installed onboard to provide relay service to USNA.
 - Used to relay daily sitreps and provide emergency communications to/from the Navy Sailing Duty Officer (NSDO)
 - Phone numbers published in Summer OPORD



WEATHER FAX



- Furuno DFAX (FAX-208A/N)
- Uses HF link to download and printout weather maps.
- USCG Station Marshfield, MA (NMF) covers the East Coast.
- Reed's Almanac contains schedule for broadcast:
 - 24 hr forecast, 36 hr forecast, and 500 mb forecast
 - Times for broadcasts listed in Reed's (rebroadcasted during the day several times)



REED'S NAUTICAL ALMANAC, 2001

Station name

24 hr surface
forecast

500 mb forecast

from Halifax (CFH), however, one ice chart may be broadcast within the allotted time from Iqaluit, Frobisher Bay (VFF) and Resolute (VFR) on 3253 and 7710 kHz.

*2 Broadcast time may also be used to repeat other charts or special charts as required.

U.S. COAST GUARD MARSHFIELD, MA (NMF)

Broadcast times and frequencies: 0230-0438 and 0800-1028 on 4235, 6340.5 and 9110.0 kHz; 1430-2228 on 6340.5, 9110.0 and 12750.0 kHz.

Time	UTC	Subject
0230	1430	Test pattern (start of broadcast)
0233/1433		Preliminary surface analysis, Area 1
0243		Fax schedule, Part 1
	1443	96 Hr 500MB Prog, Area 4
	1453	96 Hr surface Prog, Area 4
0254		Fax schedule, Part 2
0305		Request for comments
	1503	Satellite image, Area 5
0315	1515	Sea state analysis, Area 1
0325	1525	Surface analysis (NE Atlantic), A 2
0338	1538	Surface analysis (NW Atlantic), A 3
0351		Satellite image, Area 5
	1600	Ice Charts
	1720	Test pattern
0402	1723	(rebroadcast of 0325, 1525)
0415	1736	(rebroadcast of 0338, 1538)
0428	1749	500 mb analysis, Area 4
	1759	Satellite image, Area 4
	1810	Ice Charts
	1900	Test pattern
	1903	Fax schedule, Part 1
	1914	Fax schedule, Part 2
	1925	Request for comments
	1935	Tropical surface analysis, Area 7
0800		Test pattern
0805	2005	Prelim. surface analysis, Area 1
0815	2015	24-hour surface forecast, Area 1
0825	2025	24-hr wind/wave forecast, Area 1
0835	2035	24-hour 500mb forecast, Area 1
0845	2045	36 hour 500mb forecast, Area 1
0855	2055	48-hour surface forecast, Area 4
0905	2105	48-hr sea state forecast, Area 4
0915	2115	48-hour 500 mb forecast, Area 4
0925	2125	Surface analysis (NE Atlantic), A 2
0938	2138	Surface analysis (NW Atlantic), A 3
0951	2151	Satellite imagery, Area 6
1002	2202	(rebroadcast of 0925, 2125)
1015	2215	(rebroadcast of 0938, 2138)

Area 1: 28N-52N; 45W-85W
Area 2: 15N-65N; 10E-45W
Area 3: 15N-65N; 40W-95W
Area 4: 15N-65N; 10E-95W
Area 5: 20N-55N; 55W-95W
Area 6: 60N-60N; 30W-100W
Area 7: 32N-50N; 43W-80W

U.S. COAST GUARD BELLE CHASE, LA (NMG)

Broadcast times and frequencies: continuous on 4317.9, 8503.9, and 12789.9 kHz.

This broadcast originates from the Tropical Prediction Center of the National Weather Service, and its products are somewhat different than those of the Marine Forecast Branch.

Time	UTC	Subject
0000	1200	Tropical surface analysis, Area 1
0030	1230	24/36 hr wind/waves forecast, A 2
0050	1250	High seas forecast, Area 5
0115	1315	Q/12 hr wind/waves forecast, A 2
0135	1335	U.S. surface analysis, Area 3
0150	1350	Satellite image, Area 4
0205	1405	Request for comments & product notice
0600	1800	Tropical surface analysis, Area 1
0630	1830	Fax schedule
0650	1850	High seas forecast, Area 5
0715	1915	Q/12 hr wind/waves forecast, A 2
0735	1935	U.S. surface analysis, Area 3
0750	1950	Satellite image, Area 4
0805	2005	(rebroadcast of 0030, 1230)

Area 1: 05S-35N, 000-120W
Area 2: 10N-30N, 55W-100W
Area 3: 15N-50N, 65W-125W
Area 4: 12S-44N, 28W-112W
Area 5: 03N-31N, 35W-98W

RADIOTELEPHONE SERVICE

Note: At press time, AT&T's High Seas Coast Stations WOO, and WOM, were scheduled to close down on Oct. 9, 1999.

COAST STATION VCS

Coast Guard Radio Station, Halifax
Transport Canada
Ketch Harbour
Halifax County, NS B0J 1X0
Technical information (radio operations):
902-868-2345. SITOP service available.



Definition
of areas

48 hr surface
forecast



WEATHER FAX



- Ensure HF coupler switch is in the WXFAX position.
 - Connects HF antenna to the WXFAX vice SSB
- When replacing the paper, ensure you save the end caps on the roller...
 - *NEW PAPER ROLLS **DO NOT** COME WITH NEW CAPS!!!*



EPIRB

Emergency Position Indicating Radio Beacon

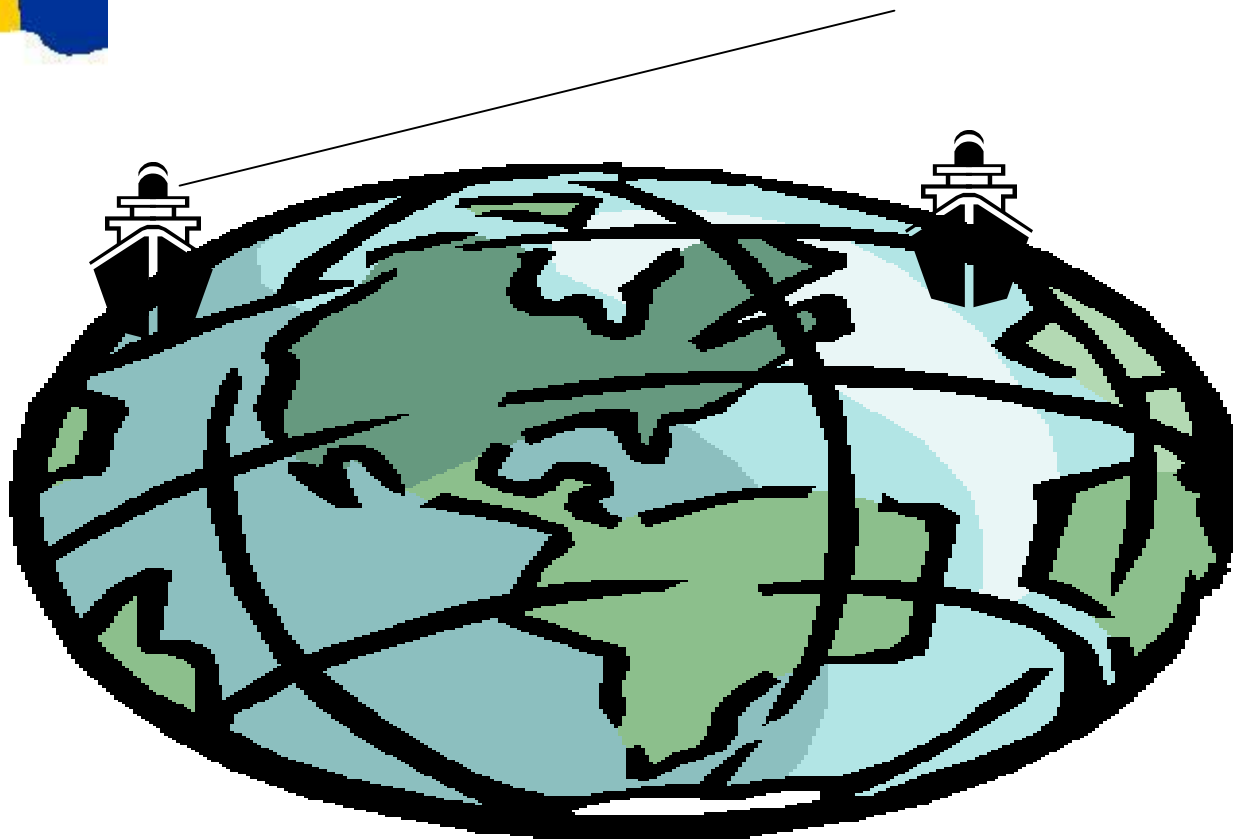


- Satellite 406 EPIRB
 - Transmits signals at 121.5 and 406 MHz.
 - Some models broadcast ship's position and name.
 - Used only for emergency situations – turning it on will activate the USCG's emergency rescue system.
 - Registered to each boat (cannot be cross decked)
 - Once the EPIRB is activated for an emergency, do not turn it off.
 - CAT I is manually activated, CAT II is automatically activated.
 - Approximately \$1000.00





VHF COMMS



VHF antennas require LOS: $d = 7.14(K \cdot h)^{1/2}$
h = height of antennas
K = refraction factor



VHF COMMS



- ICOM M100 (NA 1–8) or M120 (NA 9–20)
- Line of sight (LOS) communications.
- Used for:
 - Ship to ship
 - Ship to shore (w/in sight of land)
 - Local weather



VHF COMMS



- ICOM radios have ability to store channels in memory and scan channels.
 - At beginning of cruise, verify the desired channels in memory:
 - 9, 13, 16, 82A, squadron channel
 - While underway, scan those channels using memory scan feature.



COMM PROCEDURES



- Appendix II of Annex A of OPORD describes the communications and reporting procedures for summer cruise.
- Daily reports:
 - When underway, the OTC shall make a daily report by the following methods:
 - SATPHONE at 0700 with daily status
 - HF Voice per OPORD if SATPHONE is OOC



COMM PROCEDURES



- If morning comm check is not successful, an afternoon comm check per OPORD
- Situation reports (SITREP) are to be made on an as-needed basis.
- Making reports in port:
 - Daily report
 - SITREP



SAFETY MESSAGES



- SECURITE – third priority messages concerning navigation or weather.
- PAN PAN – second priority urgent communications concerning the safety of a ship, aircraft, other vessel or person in sight or on board.
- MAYDAY – absolute first priority distress calls involving imminent danger of loss of life or vessel.



HAILING MERCHANTS



- When do you hail a merchant?
- How do you hail a merchant?



HAILING MERCHANTS



TOO LATE!!



HAILING MERCHANTS



- When do you hail a merchant –
 - Whenever you think the pilot on the bridge of the merchant would like to know your intentions.
 - When you want to know the intentions of the merchant vessel.
 - Definitely call when:
 - Entering a traffic scheme with traffic visible
 - Crossing a channel with traffic visible
 - Crossing the bow of a merchant
 - You are unsure about the intentions of the merchant



HAILING MERCHANTS



- When hailing merchants, ensure you identify who you are and the specific vessel you are calling.
 - i.e. “Merchant vessel in Chesapeake Bay, this is sailing vessel...”
- Identifying merchants:
 - Name the type of vessel (tanker, car-carrier, etc.) or the color of the vessel
 - Give reference to landmark (Bloody Pt, Cove Pt)
 - Give merchant’s course (northbound or southbound)
 - Give merchant’s approximate LAT/LONG (last resort)



HAILING MERCHANTS

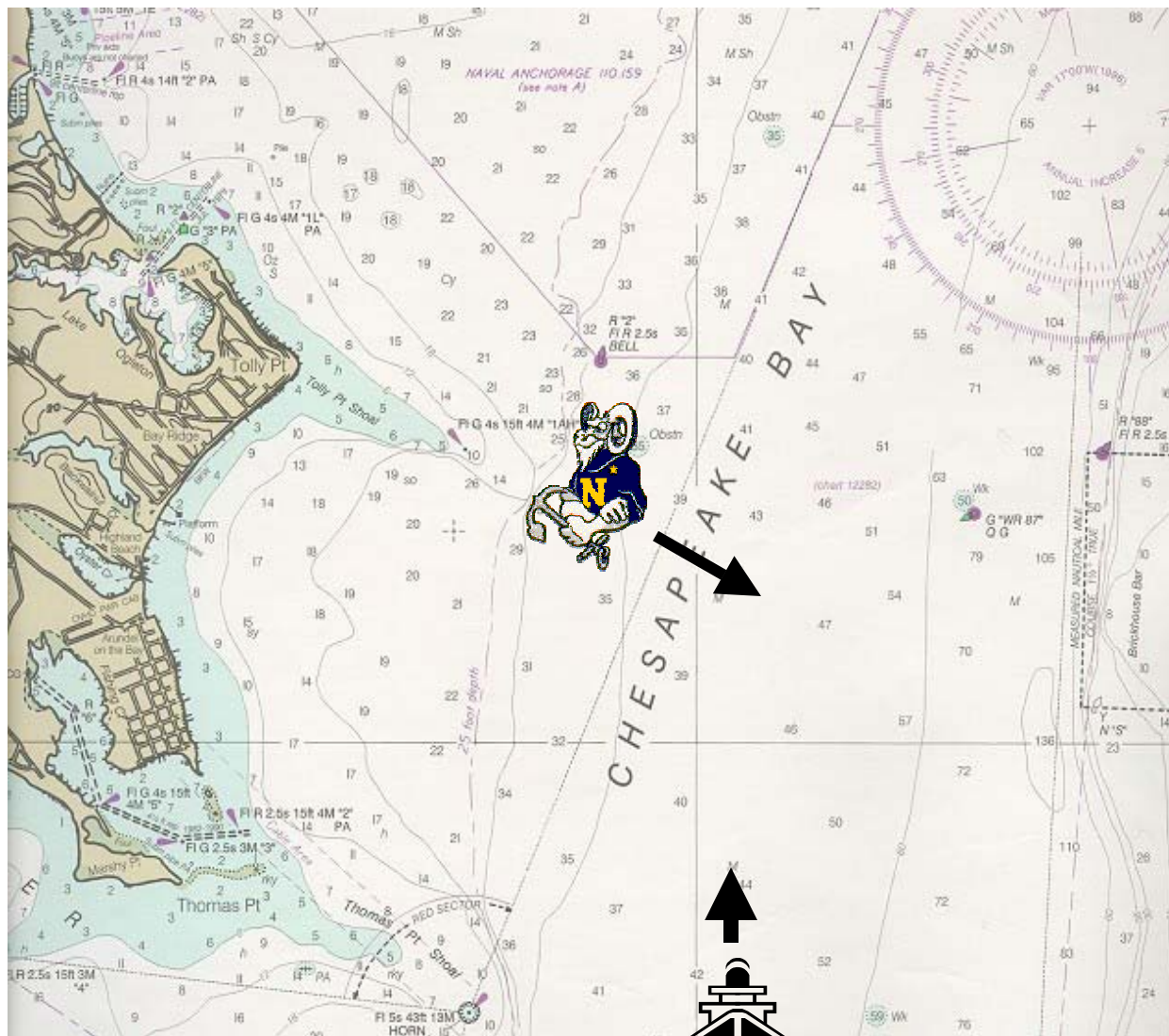


- Identifying yourself:
 - Give your position relative to a landmark and the merchant.
 - Give your course.
 - Give your description (blue sloop...)
 - Tell them your lighting configuration
- State your intentions (**Stay out of their way!**)
- Do not cross the bow of tug and tow without first contacting the tug via VHF.



HAILING MERCHANTS PRACTICAL





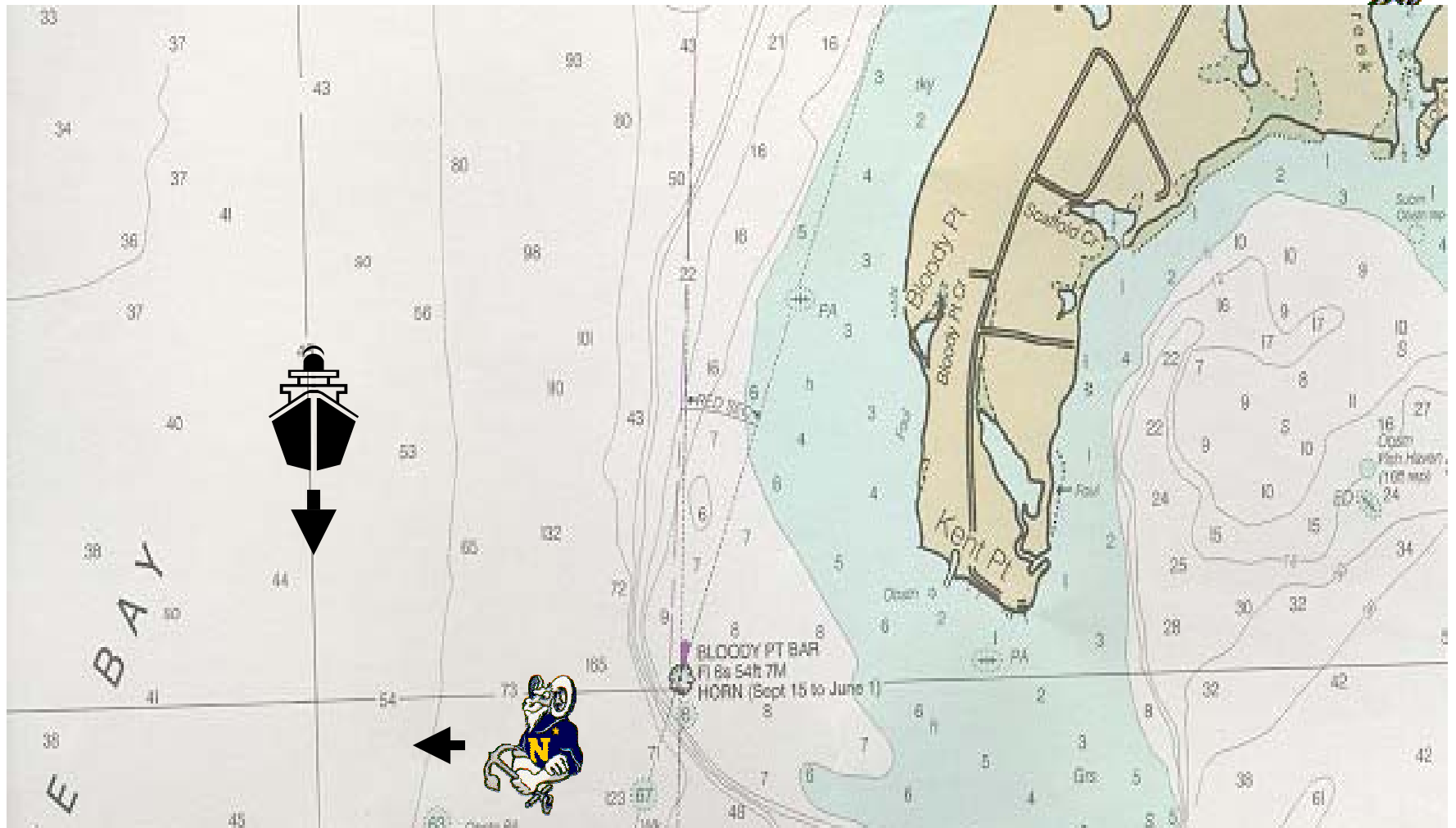


HAILING MERCHANTS

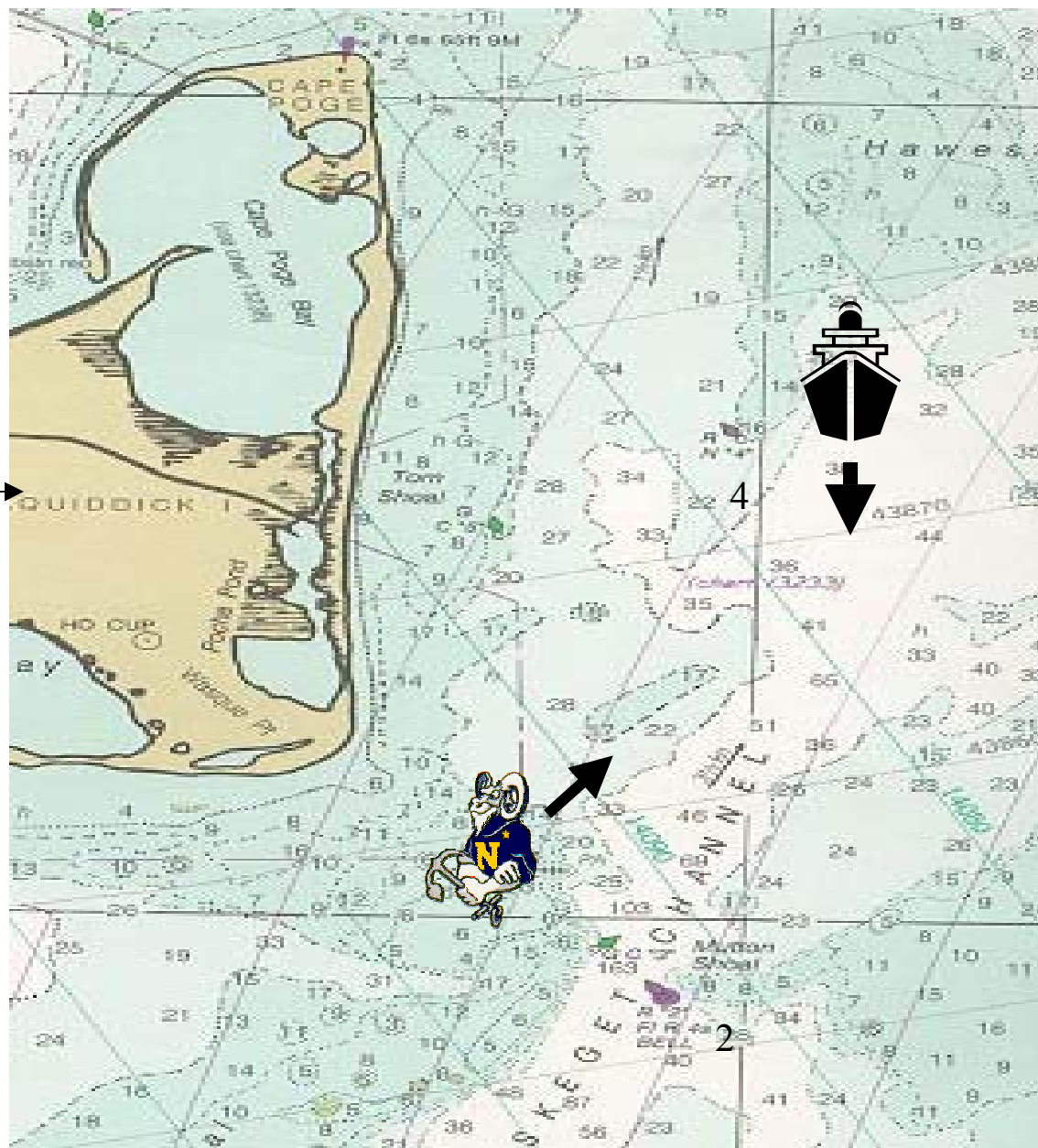


- Northbound blue-hull tanker east of Thomas Point, this is the sailing vessel *Challenger*, off your port bow, east of Tolly Point, CH 13, over.
- *Challenger*, this is *Rusty Bucket*, roger over.
- This is *Challenger*, good afternoon Captain, we will stay on your port side and pass astern of you, over.
- This is *Rusty Bucket*, roger Captain, thank you and have a nice sail, OUT.
- This is *Challenger*, roger out.



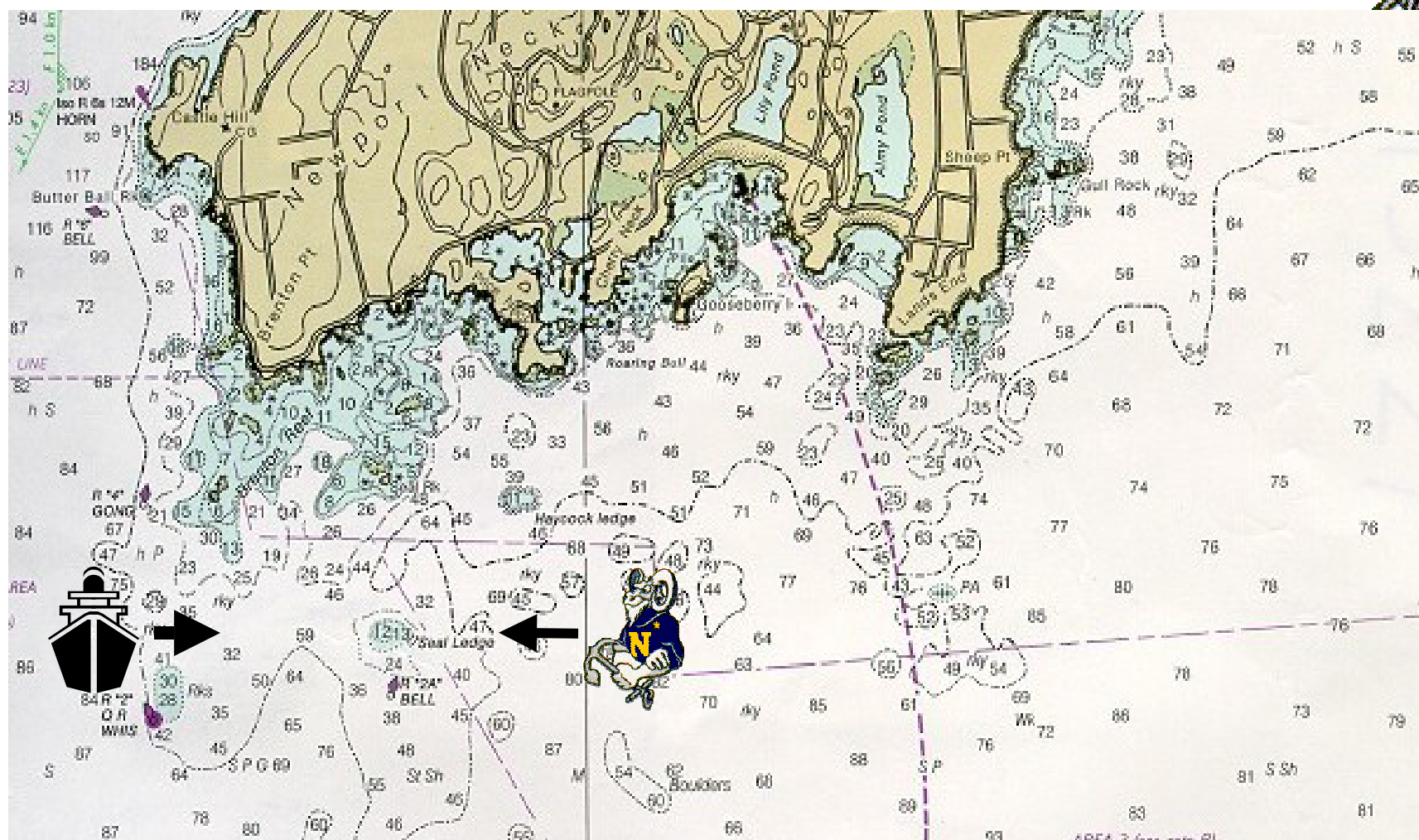




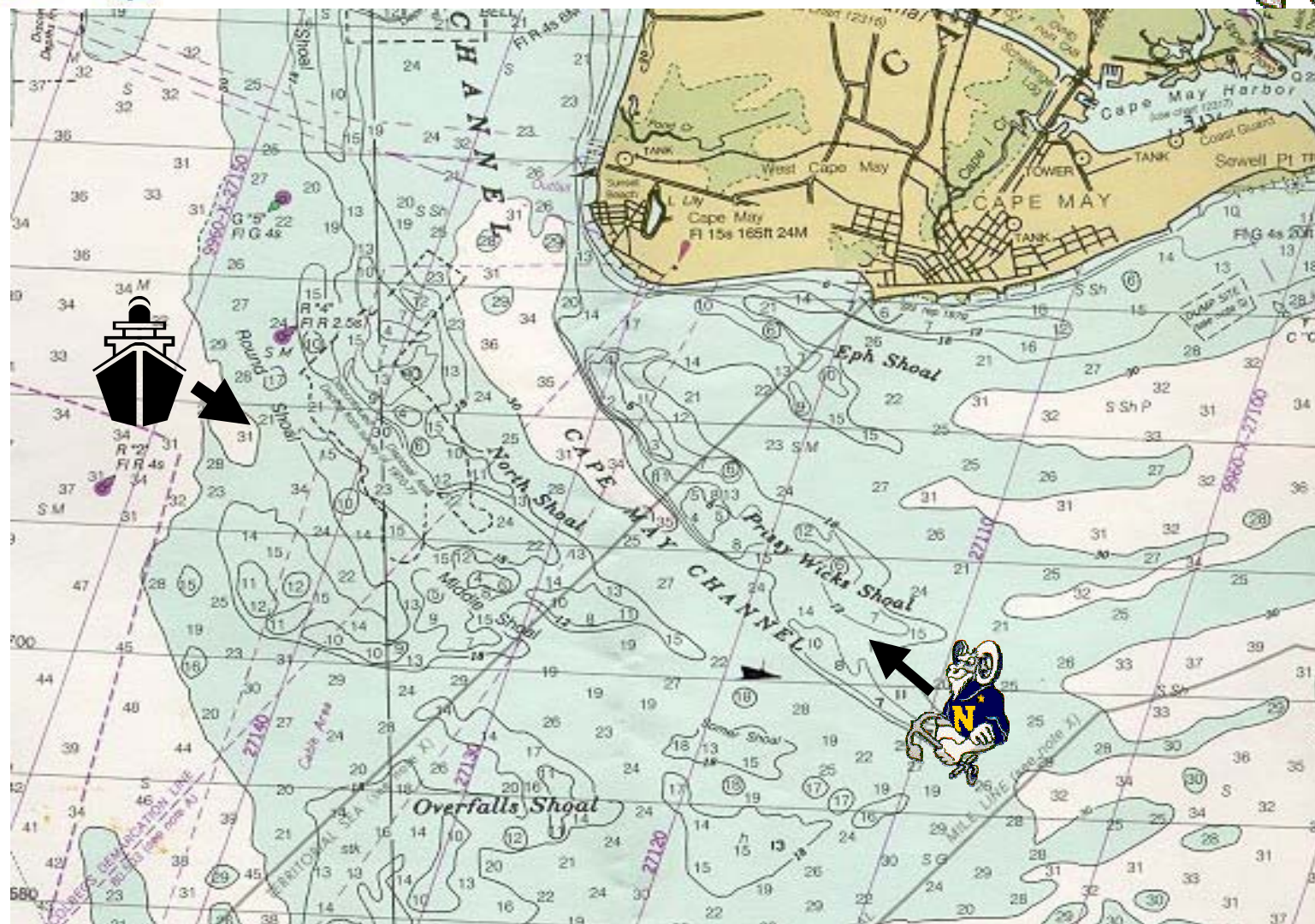


Chappquiddick
Island →











QUESTIONS

